

United States
Department of
Agriculture

Forest
Service

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Reply To: 3420 Pest Management Evaluations

Date:

MAY 6 1985

Subject: East Fork Devils Creek Survey, Zig Zag RD

To: Forest Supervisor, Mt. Hood NF

On April 16 and 23, Craig Schmitt, Greg Filip, and Bob Harvey, Plant Pathologists from Forest Pest Management, were on the Zig Zag Ranger District at the request of Dave Hanken from the District to survey the proposed East Fork Devils Creek TSI Unit for root diseases. The stand has been tentatively scheduled for precommercial thinning in FY 1986. Dave had requested the survey upon determining that the incidence of root diseases was severe enough that the treatment prescription may have to incorporate root disease management strategies. Dave requested that the location of root diseases be identified by pathogen, mapped, and that disease management recommendations be developed for reducing future losses in this area.

Site and Stand Description

The East Fork Devils Creek Unit is approximately 90 acres. The site is a south-facing slope with several basalt outcrops and talus rockfalls. Slope averages approximately 50 percent, with the steepest ground at the west edge and a broad bench at the top (north) end of the unit. The stand is a Douglas-fir plantation with minor components of western hemlock, Pacific silver fir, and lodgepole pine naturals. Several stands of red alder are present in the wet, low-lying portions of the unit. Several other hardwoods, including cherry, bigleaf maple, and dogwood, are present throughout the unit. The Douglas-fir is 32 years old, having been planted in 1953. The previous stand was clearcut using a highlead cable system. A main spur, which is now brushed in, accesses the unit. This stand has never been precommercially thinned. Most trees are in the 2- to 6-inch diameter size classes, while a few trees up to 12 inches are present.

METHODS

This unit was surveyed using a three-person crew. Transects were run across the unit at 5-chain (330 ft.) intervals. One person walked a compass line and mapped the incidence of disease. The two others reconnoitered a strip 2.5 chains wide on either side of the transect. This system allowed for close to 100 percent coverage of the survey area. Root disease centers were mapped based on the furthest extent of dead or symptomatic trees. This information was used to make a composite map of the area (enclosed).

Dead and dying trees were inspected for causal pests. This included excavating a portion of one or two major roots and inspecting for resinosis, fungal growth on the exterior or interior of the bark, fungal growth in the cambial zone, and stain or decay in the sapwood.

RESULTS

The survey revealed extensive root disease in a portion of the unit. Several additional scattered root disease centers were found (see enclosure). Laminated root rot, caused by Phellinus weirii, was the most common disease present. Damage occurring as mortality and understocking in areas affected by laminated root rot was found in three centers, the largest disease center being in the southwest portion of the unit. Centers of mortality caused by laminated root rot were spreading, as indicated by the numerous recently-killed and symptomatic trees around the perimeters. A minor amount of Armillaria root disease, caused by Armillaria (mellea) ostoyae, was found in four small centers in the unit. This disease was causing mortality and understocking of Douglas-firs. Spread rates and over-all virulence appeared to be somewhat less than displayed by P. weirii.

Basal and bole girdling by black bears has caused a very large amount of loss in this stand. Damage varied somewhat in intensity, but occurred throughout the unit. Bear damage is still occurring. As is usually the case, damaged and killed trees were the dominant individuals in the stand. In the east central portion of the stand, top breakage caused by heavy snow loads have damaged numerous trees. Most of this damage appeared to have happened last winter.

DISCUSSION AND MANAGEMENT ALTERNATIVES

Laminated root rot is the most serious pest problem in this unit. Bear damage has been serious in the past and will probably occur at diminishing levels as this stand ages. Armillaria root disease has caused small losses in several areas and can be expected to cause only minimal damage in the future.

Several alternatives are available for management of this stand. These include:

Defer Treatment Option

Healthy portions of this stand are overstocked, limiting growth on crop trees. By deferring a thinning, growth rates will continue to decline. The presence of laminated root rot complicates present and future management options for this stand. By deferring treatment, the following can be anticipated:

- (a) Laminated root rot centers will continue to expand at the rate of 1 to 2 feet per year.

- (b) Losses directly associated with laminated root rot will steadily increase. Disease-induced windthrow should be minimized as a result of keeping the stand closed.
- (c) Opportunities for managing other species within root disease centers will diminish as the stand matures.
- (d) Opportunities to salvage mortality are reduced because of limited access.
- (e) Yield, especially board foot, is reduced.
- (f) Level of inoculum in the soil will continue to grow, increasing the costs involved in treating the problem.

Thin Only Option

Using this option, the entire stand would be thinned to a prescribed spacing. Crop trees would be identified as the best individuals by size, form, lack of defect, and preferred species. No attempt would be made to identify diseased areas on the ground or treat them differently from other portions of the stand. By carrying out this action, the following can be anticipated:

- (a) Disease centers will continue to spread radially at a rate of 1 to 2 feet per year.
- (b) Upon opening the stand, windthrow of diseased trees may increase. This usually is most prevalent in pole-size and larger stands. Windthrow will probably continue as the stand matures. It may also be higher than normal from time of thinning until the crowns close. Currently, most diseased trees are dying while standing. Windthrow serves as a mechanism for removing some of the inoculum from the soil and breaking roots left in the ground, thereby hastening deterioration and replacement of *P. weirii*. Windthrow will result in more reduction in the amount of inoculum remaining in the soil than the defer treatment option.
- (c) Thinning the stand may make salvaging of disease mortality and windthrow easier. Commercial harvests could occur at an earlier date than the defer treatment option since growth on crop trees would increase and merchantability would improve.
- (d) Opportunities for managing other species in disease centers are lessened.
- (e) Level of inoculum in the soil will continue to grow, increasing the costs involved in treating the problem.
- (f) Yield, especially board foot, will be greater than a no-thin option.

Disease Management Option

This alternative will employ management strategies aimed at improving future timber yield by slowing disease spread and the susceptibility of the stand to laminated root rot. The following are the suggested steps involved in implementing this option:

- (1) Using the enclosed disease occurrence map as a guide, delineate, on the ground, laminated root rot centers. Nonsymptomatic trees whose roots are likely to contact with those of symptomatic trees should be marked for cutting. These nonsymptomatic trees serve as a disease pathway to healthy trees. If the disease pathway trees are cut, P. weirii will not grow on their roots after they die and spread to healthy trees. In most stands of precommercial thinning size, the disease pathway trees will be within 10 feet of symptomatic trees. To make this approach work, disease centers should be marked by people able to recognize the disease, or the thinners must be skilled in recognizing it.
- (2) During the thinning entry, remove all Douglas-firs from laminated root rot centers. The remainder of the stand may be thinned to the prescribed spacing.
- (3) Depending upon stocking levels of other species within disease centers, either thin trees to the desired spacing, regenerate the centers to fast-growing alternate species, or interplant with these species until full stocking is achieved. Recommended adapted tree species which can be managed in laminated root rot centers include: red alder, bigleaf maple, and lodgepole pine. Western hemlock can also be managed and is recommended, but some carryover of infection may result.

The following may be anticipated by implementing this option:

- (a) Spread of disease centers will be greatly slowed; some may cease to spread.
- (b) Levels of inoculum in the soil will be slowly reduced.
- (c) Losses directly associated with laminated root rot will be reduced.
- (d) Opportunities for managing species other than Douglas-fir increase. The outlook for successful management of Douglas-fir around disease centers in this generation is improved.
- (e) Yield is maximized.
- (f) Following stand removal at maturity, Douglas-fir can be grown throughout this unit.

Other Pests

Armillaria root disease is present, yet is causing damage in only small pockets. These should be thinned the same as healthy portions of the stand. Regenerating these small centers should not be necessary due to the presence of other species. Mortality to Douglas-fir should be minimal in the future.

Black bear damage may continue for some time, although most of the damage has already been done. A bear control program would minimize losses in this and other young stands in the area.

Forest Pest Management personnel are available to assist the Forest in any other pest management problems.

PAUL E. BUFFAM

PAUL E. BUFFAM
Director of Forest Pest Management

Enclosure

cc:
Dave Hanken, Zig Zag RD

CLSchmitt:pj 5/6/85 FLIPS

EAST FORK DEVILS CREEK UNIT

ZIG ZAG RD

MT. HOOD NF

LOCATION OF ROOT DISEASES

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